

What is claimed is

1           1. An image processing apparatus comprising:  
2           an acquisition unit for acquiring image data that  
3           includes a plurality of pixels, each of which is set as a  
4           target pixel to be judged;  
5           a color pixel judgment unit for judging whether the target  
6           pixel is a color pixel, the color pixel being a pixel other  
7           than a monochrome pixel;  
8           a color area judgment unit for judging whether the target  
9           pixel is in a color area that includes a plurality of color  
10          pixels, by referring to a judgment result of the color pixel  
11          judgment unit;  
12          a character-half-tone judgment unit for judging whether  
13          the target pixel is in an edge area of a character that is  
14          present on a half-tone-dot area; and  
15          a switch unit for switching, when a judgment result of  
16          the character-half-tone judgment unit is affirmative, an  
17          operation of image processing to be performed on the target  
18          pixel in accordance with a judgment result of the color pixel  
19          judgment unit and a judgment result of the color area judgment  
20          unit.

1           2. The image processing apparatus of Claim 1,  
2           wherein the character-half-tone judgment unit includes:

an edge judgment unit for judging whether the target pixel is in an edge area of a character; and

an isolated pixel judgment unit for judging whether the target pixel corresponds to an isolated pixel, and

the character-half-tone judgment unit judges whether the target pixel is in an edge area of a character that is present on a half-tone-dot area, by referring to a judgment result of the edge judgment unit and a judgment result of the isolated pixel judgment unit.

3. The image processing apparatus of Claim 2,

wherein the character-half-tone judgment unit includes:

an edge continuity judgment unit for judging a continuity of pixels that are each judged to be in an edge area of a character, by referring to a judgment result of the edge judgment unit relating to a plurality of pixels in a first window of a predetermined size that includes the target pixel; and

an isolated pixel counter for counting a number of isolated pixels in a second window of a predetermined size, by referring to a judgment result of the isolated pixel judgment unit relating to the plurality of pixels in the second window,

wherein the character-half-tone judgment unit judges whether the target pixel is in an edge area of a character that is present on a half-tone-dot area, by referring to a

16 judgment result of the edge continuity judgment unit and the  
17 number of isolated pixels counted by the isolated pixel  
18 counter.

1 4. The image processing apparatus of Claim 2,  
2 wherein the isolated pixel judgment unit judges whether  
3 the target pixel corresponds to an isolated pixel, by referring  
4 to brightness of a plurality of pixels in a window of  
5 predetermined size that includes the target pixel.

1 5. The image processing apparatus of Claim 1,  
2 wherein the switch unit switches the operation of the  
3 image processing between operations of (a) performing edge  
4 enhancement and (b) not-performing edge enhancement.

1 6. The image processing apparatus of Claim 1,  
2 wherein the switch unit switches the operation of the  
3 image processing to be performed on the target pixel, to an  
4 operation of not performing edge enhancement that involves  
5 (a) attenuation of color components and (b) enhancement of  
6 black components, when the color pixel judgment unit judges  
7 that the target pixel is not a color pixel and the color area  
8 judgment unit judges that the target pixel is not in a color  
9 area.

1           7. An image forming apparatus comprising:  
2           an acquisition unit for acquiring image data that  
3 includes a plurality of pixels, each of which is set as a  
4 target pixel to be judged;  
5           a color pixel judgment unit for judging whether the target  
6 pixel is a color pixel, the color pixel being a pixel other  
7 than a monochrome pixel;  
8           a color area judgment unit for judging whether the target  
9 pixel is in a color area that includes a plurality of color  
10 pixels, by referring to a judgment result of the color pixel  
11 judgment unit;  
12           a character-half-tone judgment unit for judging whether  
13 the target pixel is in an edge area of a character that is  
14 present on a half-tone-dot area;  
15           a selector for selecting, when a judgment result of the  
16 character-half-tone judgment unit is affirmative, an  
17 operation of image processing to be performed on the target  
18 pixel in accordance with a judgment result of the color pixel  
19 judgment unit and a judgment result of the color area judgment  
20 unit;  
21           an image correction unit for correcting the image data,  
22 in accordance with a selection result of the selector; and  
23           an image forming unit for forming an image, based on  
24 the image data corrected by the image correction unit.

8. The image forming apparatus of Claim 7,  
 wherein the character-half-tone judgment unit includes:  
 an edge judgment unit for judging whether the target  
 pixel is in an edge area of a character; and  
 an isolated pixel judgment unit for judging whether the  
 target pixel corresponds to an isolated pixel,  
 wherein the character-half-tone judgment unit judges  
 whether the target pixel is in an edge area of a character  
 that is present on a half-tone-dot area, by referring to a  
 judgment result of the edge judgment unit and a judgment result  
 of the isolated pixel judgment unit.

9. The image forming apparatus of Claim 8,  
 wherein the character-half-tone judgment unit includes:  
 an edge continuity judgment unit for judging a continuity  
 of pixels that are each judged to be in an edge area of a  
 character, by referring to a judgment result of the edge  
 judgment unit relating to a plurality of pixels in a first  
 window of a predetermined size that includes the target pixel;  
 and  
 an isolated pixel counter for counting a number of  
 isolated pixels in a second window of a predetermined size,  
 by referring to a judgment result of the isolated pixel judgment  
 unit relating to the plurality of pixels in the second window,  
 wherein the character-half-tone judgment unit judges

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14 whether the target pixel is in an edge area of a character  
15 that is present on a halftone-dot area, by referring to a  
16 judgment result of the edge continuity judgment unit and the  
17 number of isolated pixels counted by the isolated pixel counter.

1 10. The image forming apparatus of Claim 8,  
2 wherein the isolated pixel judgment unit judges whether  
3 the target pixel corresponds to an isolated pixel, by referring  
4 to brightness of a plurality of pixels in a window of a  
5 predetermined size that includes the target pixel.

1 11. The image forming apparatus of Claim 7,  
2 wherein the selector selects the operation of the image  
3 processing from operations of (a) performing edge enhancement  
4 and (b) not-performing edge enhancement.

1 12. The image forming apparatus of Claim 7,  
2 wherein the selector selects the operation of the image  
3 processing to be performed on the target pixel, as an operation  
4 of not-performing edge enhancement that involves (a)  
5 attenuation of color components and (b) enhancement of black  
6 components, when the color pixel judgment unit judges that  
7 the target pixel is not a color pixel and the color area judgment  
8 unit judges that the target pixel is not in a color area.

13. An image processing method comprising:

an acquisition step for acquiring image data that includes a plurality of pixels, each of which is set as a target pixel to be judged;

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        a color pixel judgment step for judging whether the target
pixel is a color pixel, the color pixel being a pixel other
than a monochrome pixel;

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a color area judgment step for judging whether the target pixel is in a color area that includes a plurality of color pixels, by referring to a judgment result in the color pixel judgment step;

a character-half-tone judgment step for judging whether the target pixel is in an edge area of a character that is present on a half-tone-dot area; and

a selection step for selecting, when a judgment result in the character-half-tone judging step is affirmative, an operation of image processing to be performed on the target pixel in accordance with a judgment result in the color pixel judging step and a judgment result in the color area judging step.

14. The image processing method of Claim 13,

wherein the character-half-tone judgment step includes:

an edge judgment sub-step for judging whether the target pixel is in an edge area of a character; and

5 an isolated pixel judgment sub-step for judging whether  
6 the target pixel corresponds to an isolated pixel,  
7 wherein in the character-half-tone judgment step,  
8 whether the target pixel is in an edge area of a character  
9 that is present on a half-tone-dot area is judged, by referring  
10 to a judgment result in the edge judgment sub-step and a judgment  
11 result in the isolated pixel judgment sub-step.

1 15. The image processing method of Claim 14,  
2 wherein the character-half-tone judgment step includes:  
3 an edge continuity judgment sub-step for judging a  
4 continuity of pixels that are each judged to be in an edge  
5 area of a character, by referring to a judgment result in  
6 the edge judgment step relating to a plurality of pixels in  
7 a first window of a predetermined size that includes the target  
8 pixel; and

9 an isolated pixel count sub-step for counting a number  
10 of isolated pixels in a second window of a predetermined size,  
11 by referring to a judgment result in the isolated pixel judgment  
12 step relating to the plurality of pixels in the second window,  
13 wherein in the character-half-tone judgment step,  
14 whether the target pixel is in an edge area of a character  
15 that is present on a half-tone-dot area is judged, by referring  
16 to a judgment result in the edge continuity judgment sub-step  
17 and the number of isolated pixels counted in the isolated



18 pixel count sub-step.

1 16. The image processing method of Claim 14,  
2 wherein in the isolated pixel judgment step, whether  
3 the target pixel corresponds to an isolated pixel is judged,  
4 by referring to brightness of a plurality of pixels in a window  
5 of a predetermined size that includes the target pixel.

1 17. The image processing method of Claim 13,  
2 wherein in the selection step, the operation of the image  
3 processing is selected from operations of (a) performing edge  
4 enhancement and (b) not-performing edge enhancement.

1 18. The image processing method of Claim 13,  
2 wherein in the selection step, the operation of the image  
3 processing to be performed on the target pixel is selected  
4 as an operation of not performing edge enhancement that  
5 involves (a) attenuation of color components and (b)  
6 enhancement of black components, when the target pixel is  
7 judged not to be a color pixel in the color pixel judgment  
8 step and the target pixel is judged not to be in a color area  
9 in the color area judgment step.